Statistics and Trends From The Belwood Lake Pike Derby, 1981-2011

Southern Region, Guelph District
Technical Report

Ontario Ministry of Natural Resources

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L. Knopf and A. Timmerman

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Cover Photo: Anglers at Belwood Lake during the 2011 Belwood Lions Pike Derby (Photo by A. Timmerman).

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Executive Summary

The Belwood Lions Pike Derby has been held annually at Belwood Lake from 1981 to the present. Data from the pike derby were obtained from records of the Belwood and District Lions Club, the Grand River Conservation Authority, and the Guelph office of the Ontario Ministry of Natural Resources. Available data were analysed for trends in angler participation, angler success, harvest rate, number of northern pike entered, mean length of the ten longest fish entered each year, length-weight regression, condition factor, mean length and weight at age and stomach contents.

The number of derby registrants has decreased from the high of 787 in 1998 and has stabilized at around 480 for the past five years. The harvest rate of northern pike among derby participants has decreased significantly since 1985. Since 2005 there has been a downward trend in the number of pike entered in the derby suggesting a decrease in the abundance of northern pike larger than 24" in Belwood Lake. The number of pike entered in the derby in 2010 and 2011 was markedly lower than all other years, with seven and three pike being entered, respectively. There was no apparent trend in the mean size of the 10 largest fish entered. Most fish that achieved the minimum total length of 24" (61 cm) for entry into the derby were at least four years old. Of the fish that contained identifiable fish remains, 59% contained yellow perch, 25% contained white sucker and 25% contained minnows.

Changes to the operating regime and fish community of Belwood Lake are discussed as possible factors affecting the northern pike population. Recommendations to improve the value of the derby as a source of data for fisheries management are presented as are suggestions for reducing the stress on northern pike.

1.0 Introduction

The northern pike *(Esox lucius)* is a valuable sportfish which forms a significant component of Ontario's recreational fishery (OMNR 2006). Found in over 6,400 lakes across Ontario (OMNR 1990), it has been identified as the second most preferred species by anglers in Ontario by the 2000 and 2005 Recreational Fishing Surveys (OMNR 2003, 2009). However, the northern pike is vulnerable to angling, and this vulnerability, combined with it's popularity as a sportfish, can make the species susceptible to overharvesting (Mosindy et al. 1987; OMNR 2006). Indeed, catch rates for northern pike in Ontario have declined from 1995 to 2005 (OMNR 2009).

Belwood Lake (43°46′ N, 80°20′ W) is located in Wellington County north of Fergus, Ontario (Figure 1). The lake, owned and operated by the Grand River Conservation Authority (GRCA), is a 758 ha reservoir that was created in 1942 with the construction of the Shand Dam on the Grand River. The Shand Dam, used for flood control and low flow augmentation, was the first dam built in Canada that was designed only for water control purposes.

High densities of yellow perch *(Perca flavescens)* were recorded in Belwood Lake as least as early as 1961. Beginning in 1970, northern pike were introduced to Belwood Lake to both balance the yellow perch population and to increase individual growth rates (Sandilands 1972). Northern pike were released in 1970, 1972, 1973 and 1977 (Appendix 1). These initial releases consisted of northern pike transferred from Pinehurst Lake and Watts Pond in Brant County and Shades Mills Reservoir in Cambridge. Watts Pond is pond/wetland on Charlie Creek which is a tributary of the Nith River. In 1987, an additional 24 northern pike were transferred from the Conestogo River below the Conestogo Dam to Belwood Lake by the GRCA and the Belwood and District Lions Club. The Belwood and District Lions Club also transferred northern pike from the Orangeville Reservoir to Belwood Lake in 1994 and 1995 (Appendix 1).

Anglers, cottagers, and other users of Belwood Lake are concerned about the high level of angling pressure resulting from the Belwood Lake fishery *(R. Messier, pers. comm., 2011)*. The Grand River Fisheries Management Plan (OMNR and GRCA 1998) provides guidance for the management of Grand River fisheries such as the northern pike fishery in Belwood Lake. The Fisheries Management Plan identifies a lack of adequate information on the fish community, angler harvest, and use of the fishery as an issue with Belwood Lake. The Plan recommends a need for data collection and assessment, including a review of the status of existing fish community information, assessment and monitoring of angler success and impacts on fish populations, and assessment of fish production in response to harvest and sustainability to develop and implement effective management strategies for pike populations such as the one in Belwood Lake.

The Belwood Lions Pike Derby, organized by the Belwood and District Lions Club, is an annual competitive fishing event that provides yearly data on the northern pike population in Belwood Lake. The data provide a good opportunity to study the northern pike population of Belwood Lake. Added benefits of using tournament fishing data include that the data is inexpensive to obtain, it covers a long time frame and is readily available.

This report compiles and analyses data available on the northern pike population of Belwood Lake. The methods used to obtain and analyze the data are summarized, and

analysis of trends in angler participation, angler effort, catch-per-unit-effort, harvest rate and length, weight and age are presented. The results are discussed and strengths and weaknesses in the analysis are identified. Finally, recommendations for future derbies and data collection are made.

2.0 Methods

2.1 The Derby

The Belwood Lions Pike Derby is an annual two-day event held on the last weekend in May. Beginning in 1981, the derby has occurred for 31 years. The rules and regulations of the derby have remained relatively constant throughout its duration (Appendix 2). All northern pike entered in the derby must be caught in Belwood Lake above the Shand Dam between 5 a.m. Saturday morning and 4 p.m. Sunday afternoon. Each angler may use only one fishing rod, and any evidence of gill nets, gaffs, or snag marks will lead to disqualification of the fish.

Although the majority of rules and regulations have remained the same since 1981, three significant changes have occurred. First, a minimum size limit of 18 inches was introduced in 1984. The minimum size limit was subsequently increased to 22 inches in 1985 and to 24 inches in 1986, where it currently remains. This minimum size limit was introduced to reduce the number of two and three year old northern pike being harvested. These fish often range between 20" and 24". Sexual maturity is reached by females at age three and by males at age two.

With increasing fishing pressure on a fishery subjected to widely fluctuating water levels, a live release category was introduced in 1985 to reduce mortality. Prior to this, the derby had only a catch and keep category. Since 1992, the derby has been solely a live release derby.

Third, a "mystery length" prize was introduced to the derby around 2006. All fish that were of the minimum size (24") were measured and eligible for this "mystery length"

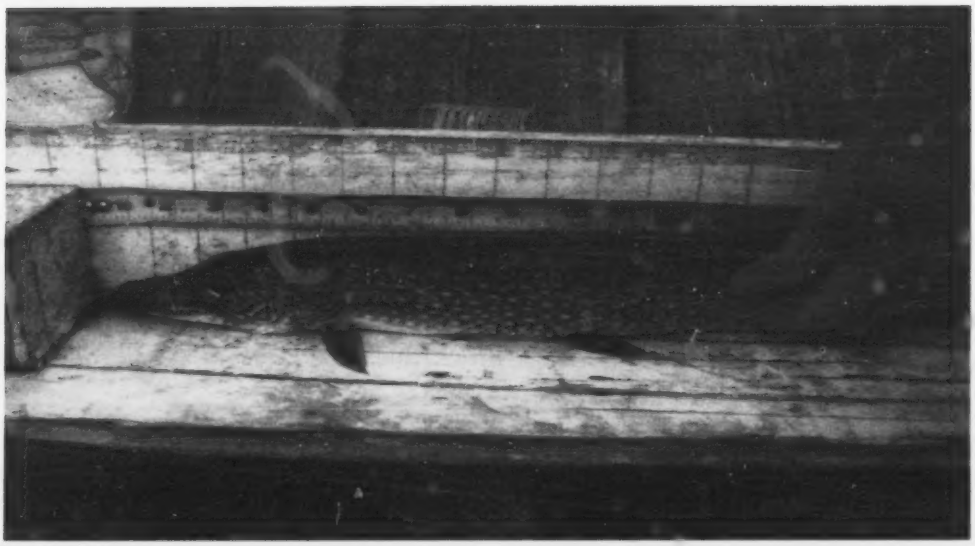
prize. The introduction of this prize may have had an impact on the number of fish entered in the derby.

The official measuring station in the village of Belwood

Prizes in the catch and keep category were awarded based on weight. Fish entered in this category had both their weights and total lengths measured. Fish were weighed to the nearest ounce and measured for total length to the nearest 1/8 inch. In the case of a tie in weight, prizes were awarded for the fish with the greatest total length. Prizes in the live release category were awarded based on total length. Fish entered in the derby were, therefore, not representative of the entire fish population in Belwood Lake. However, they represent the longest fish captured during the two-day derby.

All fish were measured and weighed by derby officials at an official measuring station. The derby headquarters and the official measuring station are located in the village of Belwood at the upstream end of the reservoir. Portable live-wells were used, or participants were supplied with plastic bags to transport northern pike to a water filled tub at the official measuring station. After measurements were taken, fish were released from the dock at the official station.

Data from the pike derby were obtained from records of the Belwood and District Lions Club, the Grand River Conservation Authority, and the Guelph office of the Ontario Ministry of Natural Resources.



A northern pike being measured at the official measuring station by derby officials.

2.2 Angler Participation

Data on the number of participants in the derby was obtained from the derby organizers. Although different categories may have existed, participants in all categories (youth, adult, and women) were combined to obtain a total number of participants for the derby. No limit on the number of participants was ever instituted in the Belwood Lions Pike Derby *(Gerry Ellen, personal communication, June 10, 2011).*

2.3 Catch-Per-Unit-Effort (CPUE)

Angler effort, catch and Catch-Per-Unit-Effort (CPUE) data were collected in 1985, 1990, 1991, 1992, 1994, 1995 (or 1996) and 2000. Creel cards provided by the GRCA (Appendix 3) were distributed to derby participants with their registration kits. Participants were encouraged to complete the creel cards through a draw prize from the completed cards. Information collected on the creel cards included angler origin, hours fished each day, number of northern pike caught and kept each day, average length of northern pike released and areas of Belwood Lake fished.

CPUE was calculated separately for each of the two days of the derby and for both days combined. The following formula was used to calculate CPUE:

$$\text{CPUE} = \frac{\text{Total number of fish caught}}{\text{Total rod hours}}$$

2.4 Harvest Rate

Harvest rate was calculated from creel survey data obtained in 1985, 1990, 1991, 1992, 1994, 1995 (or 1996) and 2000. The harvest rate was calculated using the formula:

$$\text{Harvest rate} = \frac{\text{Total number of fish harvested}}{\text{Total number of fish caught}}$$

2.5 Number of Northern Pike Entered

Data on the number of northern pike entered in the derby were obtained from the derby organizers. For comparative purposes the number of fish greater than or equal to 24 inches was then determined.

2.6 Northern Pike Length

Fish lengths which were measured to the nearest 1/8 inch were converted to the nearest 0.1 cm. The mean total length of the **ten longest fish** entered each year (regardless of category (Live Release, Catch and Keep, Youth)) was calculated for each year in which data was available to determine if there was a trend in fish size over time. By using the only the 10 longest individual fish from each year, we were assured that they were useful in documenting trends in mean length of the fish entered in the derby each year.

2.7 Northern Pike Length-Weight Regression and Condition Factor

Length and weight data are available from 1985 to 1991 after which weights were no longer measured. Fish weights which were measured to the nearest ounce were converted to the nearest 0.01 kg. The relative weight of fish of similar lengths is referred to as the condition factor. The condition factor (K) was calculated for each individual pike sampled in 1985 and 1986 using the formula of Carlander (1969):

$$K = \frac{W\,(10^5)}{L^3}$$

Where W = fish weight in grams
L = total length in mm.

In 1985, the mean condition factor (K) was calculated for each age class of northern pike based on ages derived from cleithra. In 1986 the mean condition factor (K) was calculated for each age class of northern pike, however, ages were estimated based on northern pike aged in 1985 and size ranges.

2.8 Northern Pike Length at Age

Cleithra were collected from all northern pike entered in 1985 (n=49) and most of the northern pike entered in the catch and keep category in 1986 (n=25), 1987 (n=38), 1988 (n=2) and 1989 (n=16). A total of 75 cleithra from 1985 and 1987 were aged; the 1986 cleithra were apparently not aged and their location is unknown. Cleithra collected in 1988 and 1989 are available, however, they have also not been aged.

The files do not provide information on the person(s) who aged the cleithra nor their qualifications for doing so.

2.9 Northern Pike Stomach Contents

Stomach contents of northern pike were analysed from a portion of the fish entered in the catch and keep category of the derbies from 1985 to 1988. A total of 82 stomachs were analysed.

3.0 Results

Despite extensive efforts to obtain all data generated from the 31-year history of the derby, some of the data could not be located. The number of anglers participating in four of the derbies is not available and for ten of the derbies the number appears to be rounded off. The number of northern pike entered is not available for seven of the derbies and for one year (1996), the total is highly suspect. Lengths of the ten longest northern pike are missing for 17 of the years and for some years where data exist, there is some uncertainty if the **ten longest fish** were used to calculate the mean.

3.1 Angler Participation

Ideally, participation can be used as an indication of popularity of the northern pike fishery, and could thus be related to the quality of the fishery. However, the number of participants in a given year may be largely dependent on weather. For example, the low number of participants seen in 2003 was likely due to unusually cold weather *(W. Robson, pers. comm., 2011).* As well, changes to the amount of prize money available can also affect participation (Fagen 1988).

Trends in participation show the expected initial increase in anglers over the initial years of the derby as the derby becomes more well-known (Figure 2). Insufficient data are available to determine if the introduction of the "live release only" rule in 1992 affected angler participation (Figure 2). The apparent decline in the number of northern pike over 24" in Belwood Lake since 2005 (Figures 5, 6) has not affected angler participation which has remained stable during that period. The number of derby registrants has decreased from the high of 787 in 1998 and has stabilized at around 480 for the past five years.

3.2 Catch-Per-Unit-Effort (CPUE)

Catch per unit effort (CPUE) data are often used as an index of fishing quality and relative abundance. Assumptions are that there is no increased gear efficiency, no increase in skill of anglers, and no increase in the number of novice anglers. CPUE for northern pike from seven years between 1985 and 2000 are available (Table 1, Figure 3). There was a significant decrease in CPUE between the 1985 and 1990 derbies and the CPUE during the most recent creel survey in 2000 was also well below the high of 1985. Yerex (1986) calculated a CPUE of 0.2144 for northern pike in Belwood Lake between May and September in 1985. Cooke and Gurr (1996) found a CPUE of 0.4545 for northern pike in Belwood Lake in 1995 from angler diaries. However, that figure was based on diaries received from only 13 anglers. As well, Sztramko et al. (1991) found that the skills of anglers motivated to maintain angler diaries are superior to those of the general angling public.

3.3 Harvest Rate

Harvest rates for northern pike are available for seven years between 1985 and 2000 (Figure 4). The harvest rate decreased significantly between the 1985 and the 1990 derbies, both of which had "catch and keep" categories. Yerex (1986) also found a relatively high harvest rate (49%) for northern pike in 1985 during the May to September creel survey.

Cooke and Gurr (1996) calculated a northern pike harvest rate of only 3.5 % in Belwood Lake in 1995 based on 13 angler diaries. However, it is unknown if the harvest rate of anglers motivated to maintain angler diaries is the same as the average northern pike angler.

3.4 Number of Northern Pike Entered

Data on the number of northern pike entered into the derby are available for most of the years from 1985 to 2011. For comparative purposes the number of fish greater than or equal to 24 inches was determined (Figure 5). *(the 1996 value of 100 is suspect).* Derby officials believed that all northern pike exceeding the minimum size limit were entered in the derby. If this assumption is valid, these data should provide insight regarding trends in the abundance of northern pike in the population, most specifically, northern pike over 24". The likelihood that all northern pike equal to or above the minimum size limit were being entered into the derby increased with the introduction of the "mystery length" prize around 2006 The introduction of this prize may have had an impact on the number of fish entered in the derby.

The number of anglers participating in the derby may influence the number of northern pike entered. When the number of northern pike greater than or equal to 24" is calculated per 100 participating anglers (Figure 6), a cyclical pattern appears, with peaks in 1987, 1996 and 2005 (i.e. every nine years). Since 2005, there has been a downward trend in the number of northern pike greater than or equal to 24 inches entered. This

suggests a decrease in the abundance of northern pike over the minimum length (24") in Be'wood Lake. The number of northern pike entered in the derby in 2010 and 2011 is markedly lower than all other years, with seven and three northern pike entered, respectively.

3.5 Northern Pike Length

Although major gaps in the data exist, it appears that there is no trend in the mean size of the ten longest fish (Figure 7). However, in addition to missing data, there were other problems with the data (Table 2). Lengths of the ten longest northern pike are missing for 17 of the years and for three other years, the mean was calculated from fewer than ten fish even though more than ten fish were entered in the derby. If only the absolute longest fish were used in the calculation, this would inflate the mean (i.e. 1990, 1992, 1997).

For some years, it is uncertain if the mean was actually calculated from the ten longest fish entered or from the longest fish entered in each category. The largest fish (42.6" TL) and was entered in 1999.

Fagen (1988) found that in the absence of changes to characteristics of the stock, an increase in the number of derby participants and an increase in derby prize money would be expected to produce a sharp increase in the size of the winning fish.

3.6 Northern Pike Length-Weight Regression and Condition Factor

The length-weight regression for 154 northern pike entered in the derby from 1985 to 1991 (Figure 8) can be described as weight (g) = 96.7 (total length (cm)) – 4460 ($r^2 = 0.933$; $p = < 0.0001$).

Mean condition factor (K) for northern pike age classes II to VII in 1985 and 1986 are shown in Table 3. Mean condition factor ranged from 0.59 to 0.67. Small sample sizes were associated with some of the age classes. Differences in condition factor may be indirectly related to spring water levels in the reservoir. Water level fluctuation can impact the reproductive success of yellow perch which are the primary food of northern pike in Belwood Lake *(W. Yerex, pers. comm.)*.

3.7 Northern Pike Length-at-Age

Mean length and weight-at-age were calculated from 75 northern pike aged from cleithra in 1985 and 1987 (Table 4). Most fish that achieved the minimum total length of 24" (61 cm) for entry into the derby were at least three years old. The oldest fish was aged at seven years.

3.8 Northern Pike Stomach Contents

A total of 82 northern pike stomachs were analysed between 1985 and 1988. Of the fish that contained identifiable fish remains, 59% contained yellow perch, 25% contained white sucker *(Catostomus commersoni)* and 25% contained minnows *(Cyprinidae). (some pike stomachs contained more than one type of food item).* Maximum length of yellow perch, white suckers and minnows were 20, 15 and 18 cm, respectively.

4.0 Discussion

The Grand River Fisheries Management Plan (OMNR and GRCA 1998) identified a lack of adequate information on the fish community, angler harvest, and use of the fishery as an issue with Belwood Lake. Information collected during the 31-year history of the Belwood Lake Pike Derby provides information that can be used to develop and implement effective management strategies for the northern pike population of the lake.

From 2005 onward there has been a decreasing trend in the number of northern pike greater than or equal to 24" entered in the derby. The number of northern pike entered in 2010 and 2011 was markedly lower than all other years, with seven and three pike entered, respectively. During the history of the derby, there have been a number of significant events which may have affected the northern pike population in the past or may affect it in the future. Additional studies are necessary to determine the affect of these events and others on the northern pike population in Belwood Lake.

In 1984, changes were made to the operating curve for the reservoir because of concerns about the northern pike population. This resulted in an increase in both the depth and size of the over-wintering pool and in more stable fish populations. However, the flood control and low-flow augmentation functions of the reservoir result in wide fluctuations in water depth and surface area of the reservoir on an annual basis. Periodic inspections and maintenance of the dam and control structures have required even more significant draw-downs of the reservoir during the history of the derby. Limited deep water overwintering habitat remains a concern in Belwood Lake (OMNR and GRCA 1998).

In 1988, smallmouth bass *(Micropterus dolomieu)* were first recorded from Belwood Lake when several young-of-the-year were captured during a beach seining survey. This species is now well established in the lake. Northern pike and smallmouth bass co-exist in many waterbodies in Ontario. However, a diet overlap for aquatic insects between smallmouth bass and yellow perch has been reported (Kerr and Grant 2000). Since yellow perch are the primary food of northern pike in Belwood Lake a reduction in yellow perch numbers and/or growth could affect northern pike. Direct predation by smallmouth bass is an import factor causing a shift in fish species composition in lakes (MacRae and Jackson 2001). In addition to direct predation, the presence of smallmouth bass may cause small-bodied species to shift their choice of habitat and/or alter their

foraging behaviour. A shift to more complex habitats by prey species, thereby avoiding predators, may reduce the availability of prey and other resources to sustain them.

Walleye *(Sander vitreus)* were first recorded in Belwood Lake in 2004; the result of unauthorized stocking(s) sometime previous. The walleye population appears to be increasing in size. Walleye and northern pike co-exist in many Ontario lakes and are believed to segregate spatially, however, evidence suggests that the two species may compete for food and that pike may feed on young walleye (Kerr and Grant 2000). Walleye are known to compete for food with other piscivores including northern pike, yellow perch and smallmouth bass (Kerr and Grant 2000). As well, yellow perch are known to be one of the most preferred food sources of walleye and there are several examples of declines in yellow perch abundance following the introduction of walleye (Kerr and Grant 2000).

In 2006, round goby *(Neogobius melanostomus)* were first found in Belwood Lake and it is now well established. The long term impact of this non-native species on the northern pike population of Belwood Lake is not known. Round gobies do provide an abundant food source for several sportfishes including walleye, yellow perch, and smallmouth bass. Further monitoring of the Belwood Lake fish community is necessary to determine if these inter-species interactions are contributing to the decline in the number of large northern pike evidenced through the history of the derby.

Other possible influences on the fish community in Belwood Lake include changes in angler harvest in both summer and winter and changes in water quality through improved treatment of sewage from the approximately 335 cottages around the lake and upstream communities discharging to the river upstream of the lake.

Northern pike harvest rates have decreased significantly over time. There are several possible reasons for this. In 1985 the live-release category was introduced to reduce mortality. Prior to this, the derby had only a catch and keep category. However, very few live fish were entered in the derby, possibly because this was a new initiative. As well, in 1985 the minimum size limit was only 22 inches compared to the 24 inch minimum size limit in place since then. The novelty of the live-release category and the lower minimum size limit in place in 1985 may, in part, have caused the high harvest rate that year.

Over the past several decades there has been a great effort to promote catch and release of fish to preserve declining fish stocks or to maintain fish stocks amid increasing angling pressure. Since 1985, anglers at Belwood Lake have probably adopted this new ethic similar to elsewhere in Ontario. The decline in harvest rate may also reflect a decrease in the number of large northern pike in the lake.

5.0 Recommendations

- Obtain data on the number of participants, the number of pike entered and the 10 largest pike that are missing for some of the years of the derby.
- Obtain data on changes to ice-fishing effort and harvest over time,
- Obtain information on the timing of major reservoir draw-downs required for inspections and maintenance.

- The Belwood Lake Pike Derby is a relatively inexpensive and simple method of collecting information on the use of this fishery and fishing quality over time. However, the 2-day derby covers less than 1% of the northern pike angling season and angler participation and success can be greatly affected by the water level in the reservoir and the weather during and prior to the derby. Therefore, it is essential that information on participation, effort, catch and harvest be obtained every year to determine long term trends. Creel cards should be provided to derby participants **every** year.
- Derby participants should be provided with feedback every year to acknowledge their role in contributing to management of the fishery and to encourage the accurate completion of the creel cards.
- A number of measures should be promoted to reduce stress and mortality on angler-caught northern pike that are intended to be entered in the derby:
    1. Participants should be provided with measuring tapes to reduce instances where fish below the minimum size length of 24" are brought to the measuring station;
    2. Anglers should be instructed on proper fish handling methods and provided with thick plastic bags to transport fish;
    3. An aerator or water circulator should be used in the holding tank at the measuring station to maintain oxygen levels.
    4. "Mystery length" prizes and draw prizes for fish merely registered in the derby should be discouraged since they result in an increased number of fish handled and transported to the measuring station.

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Figure 1. Belwood Lake

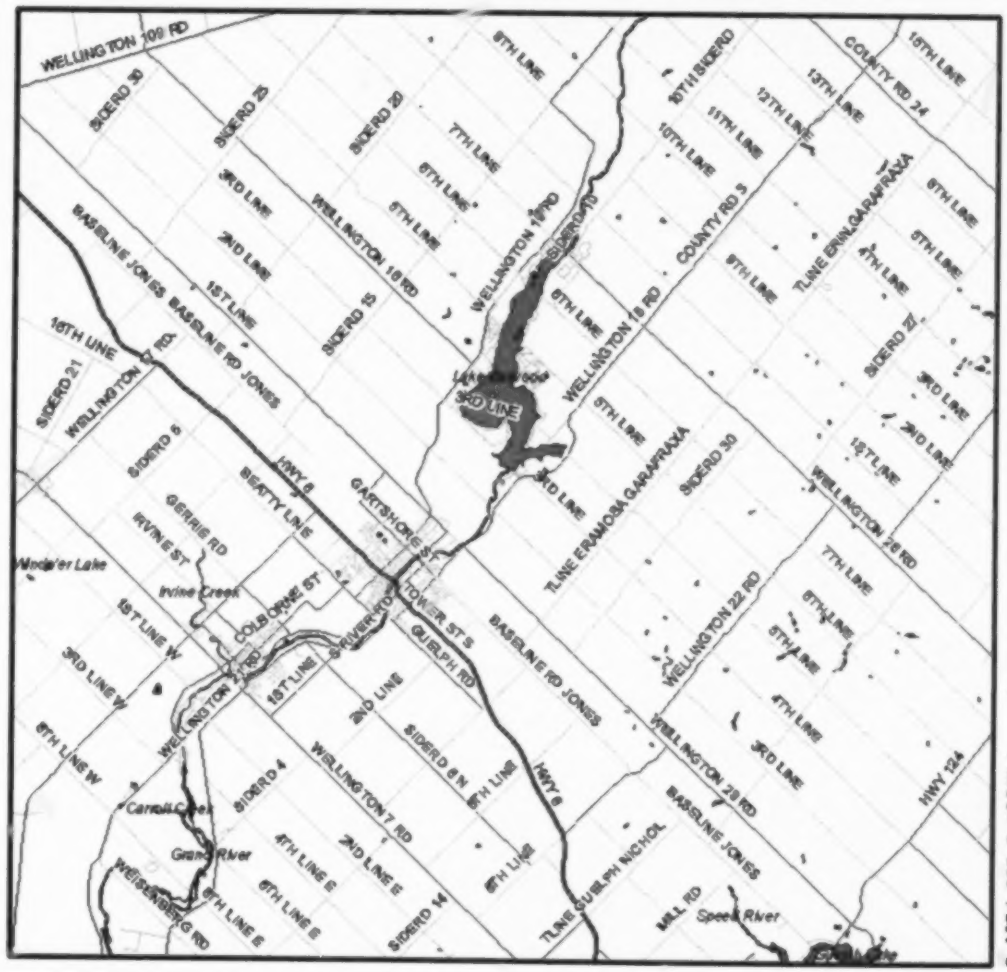

Figure 2. Number of anglers registered at the Belwood Lake Pike Derby, 1981 - 2011

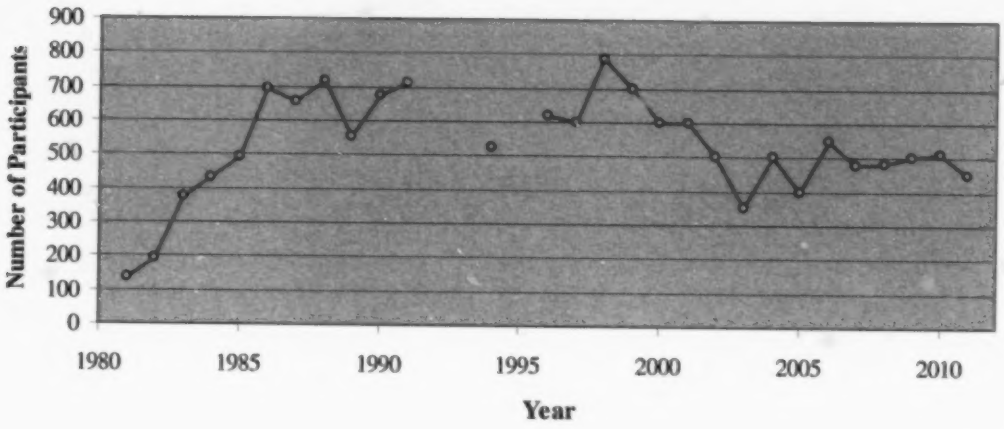

Figure 3. Northern Pike Catch Per Unit Effort (CPUE), Belwood Lake Pike Derby, 1985 - 2000

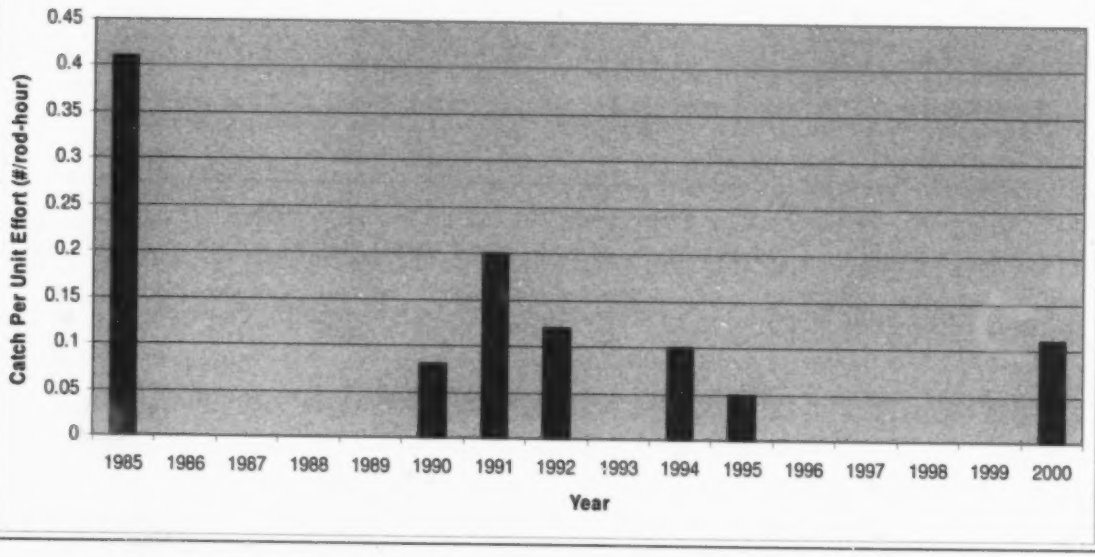

Figure 4. Harvest Rate of Northern Pike during the Belwood Lake Pike Derby, 1985 - 2000.

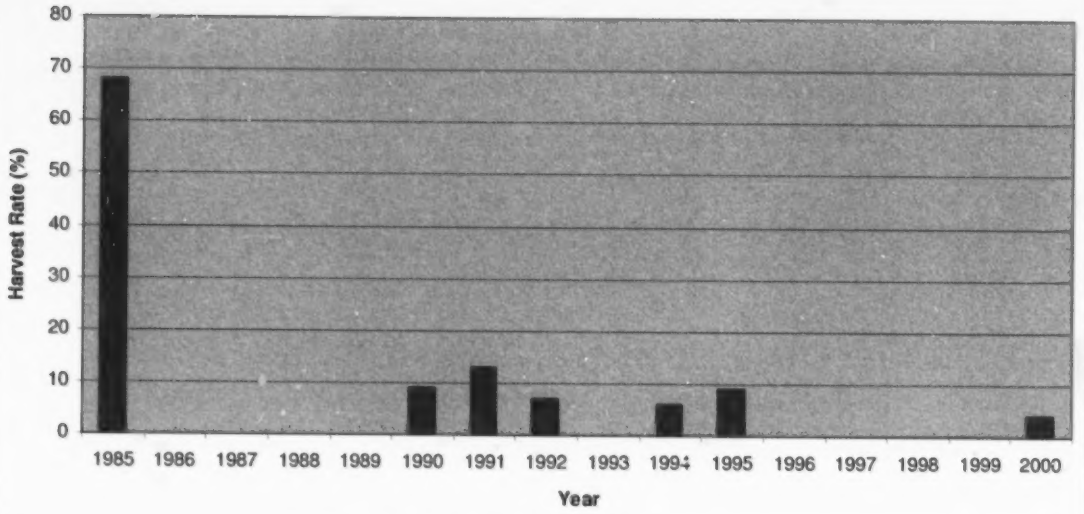

Figure 5. Number of Northern Pike > 24" Entered In Belwood Lake Pike Derby, 1985 - 2011

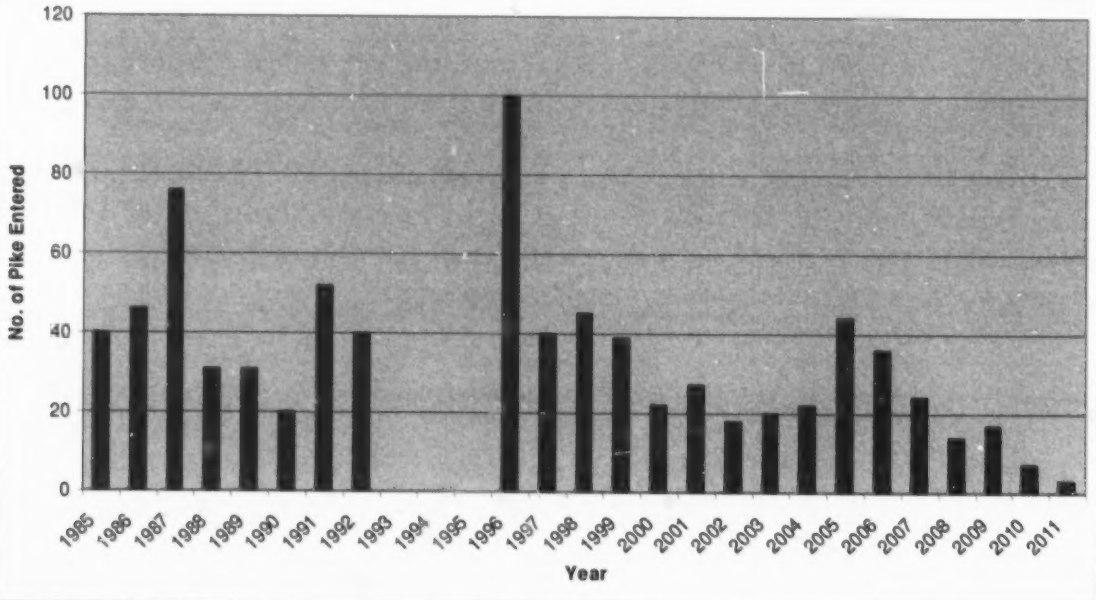

Figure 6. Number of pike greater than or equal to 24" entered per 100 anglers, Belwood Lake, 1985 - 2011

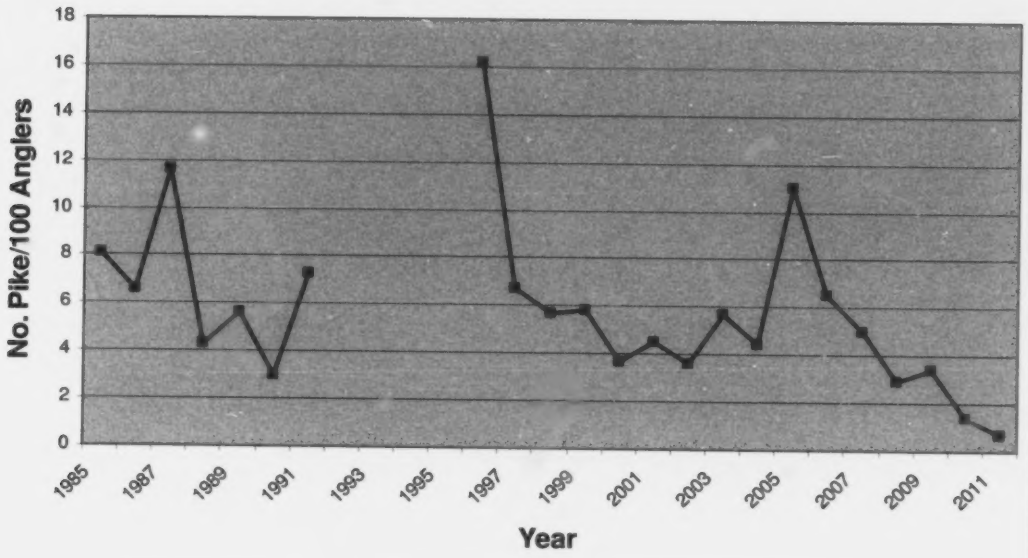

Figure 7. Mean Total Length (cm) of the Ten Longest Northern Pike, Belwood Lake Pike Derby, 1985 - 2011

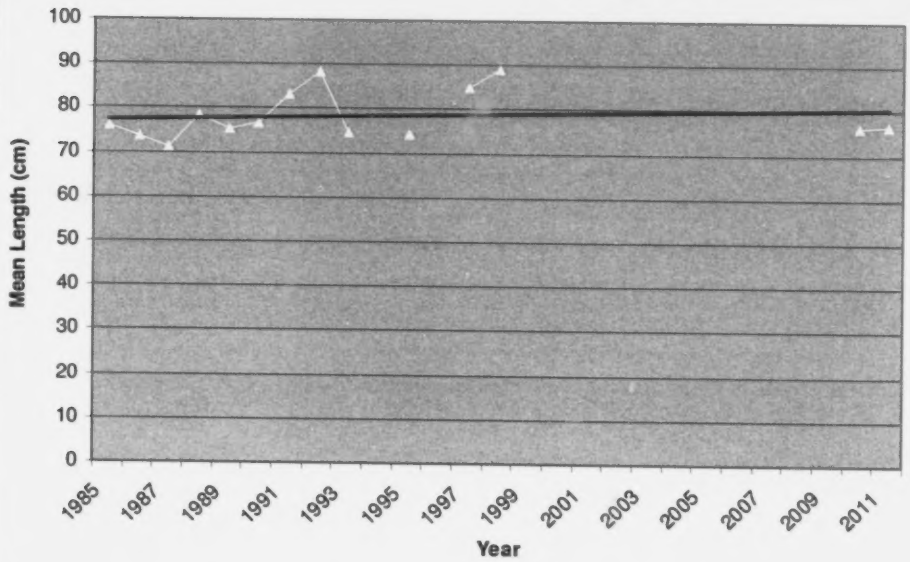

Figure 8. Length-weight regression for northern pike entered in the Belwood Lake Pike Derby, 1985 - 1991.

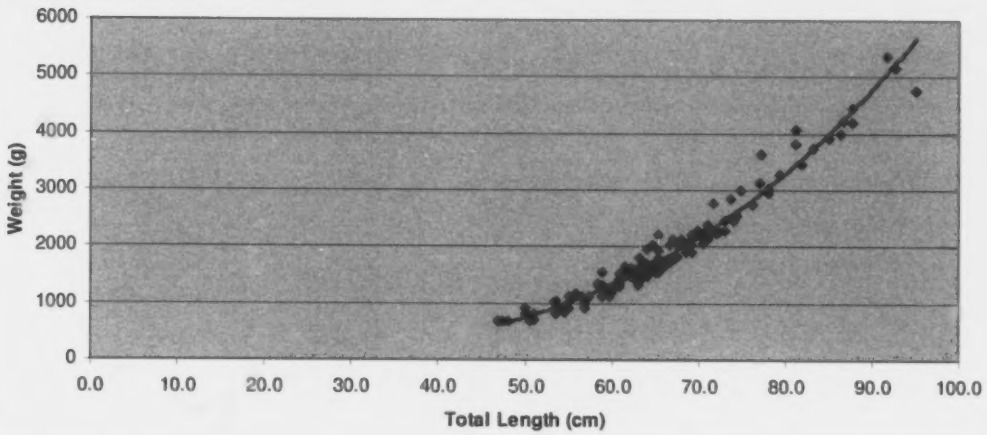

Table 1. Results from Belwood Lake Pike Derby creel surveys conducted from 1985 to 2000.

Year	1985	1990	1991	1992	1994	1995	2000
Total # creel cards submitted	95	264	118	130	63	172	126
SATURDAY							
Total # hours fished Sat.		2137	1008	1002	480	0	954
Total # pike caught Sat.		181	0	161	0	0	130
Total # pike kept Sat.		16	0	10	0	0	0
Sat. CPUE (pike/hour)		0.08	0	0.16	0		0.14
SUNDAY							
Total # hours fished Sun.		1149	514.5	714.5	427.5	0	732
Total # pike caught Sun.		90	0	47	0	0	60
Total # pike kept Sun.		8	0	5	0	0	7
Sun. CPUE (pike/hour)		0.08	0	0.07	0		0.08
TOTAL							
Total # hours fished	295.35	3286	1522.5	1716.5	907.5	0	1686
Total # pike caught	121	271	303	208	89	0	190
Total # pike kept	82	24	40	15	5	0	7
Derby CPUE (pike/hour)	**0.41**	**0.08**	**0.20**	**0.12**	**0.10**	**0.05**	**0.11**

Table 2. Total length (cm) and mean total length of the 10 longest northern pike entered in the Belwood Lake Pike Derby, 1985 to 2011.

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	95.0	81.3	76.2	88.9	91.8	81.3	100.3	91.8	97.5		101.6	92.7	83.2	106.7	108.3	97.8	102.9	90.8	99.7	76.8	88.3	73.7	91.4	86.4	95.3	97.2	92.1
	86.6	75.6	74.0	87.6	79.4	79.7	92.7	91.4	78.1		82.6		86.4	97.8												82.6	77.5
	86.4	74.9	72.1	85.1	79.4	78.1	89.5	88.9	77.2		78.7		88.3	95.3												78.1	61.0
	77.0	73.7	70.8	85.1	78.1	77.5	87.6	85.1	76.8		73.7		93.3	92.1												73.7	
	70.9	73.0	70.5	77.5	73.7	74.3	87.0	84.2	74.9		72.4		81.9	88.9												71.1	
	70.9	71.8	70.5	77.2	72.4	69.9	82.6		72.1		71.1		76.8	88.3												67.3	
	70.1	71.8	70.5	72.1	71.5		81.9		71.1		69.9			87.0												64.8	
	68.1	71.1	69.2	71.1	71.1		81.3		67.0		66.0			86.4													
	67.1	71.1	69.2	70.2	68.6		67.6		66.4		66.0			74.3													
	67.1	71.1	69.2	69.2	67.3		61.6		66.0		62.2			73.7													
Mean	75.9	73.5	71.2	78.4	75.3	76.8	83.2	88.3	74.7		74.4	92.7	85.0	89.0	108.3	97.8	102.9	90.8	99.7	76.8	88.3	73.7	91.4	86.4	95.3	76.4	76.8

= ten or more fish were entered, however, only the length of the longest fish is available

= values taken from list of top 3 fish for each category -- may not actually represent top 10 fish entered

= it appears that all fish lengths are known for this year - but some confirmation would be nice

= no data available

Table 3. Condition factor (K) of northern pike entered in the Belwood Lake Pike Derby, 1985 and 1986.

Age[1]	II	III	IV	V	VI	VII
Mean Condition Factor (K) 1985	0.60	0.60	0.62	0.64	0.59	
N	16	16	11	4	2	
Mean Condition Factor (K) 1986	0.61	0.64	0.67	0.67		0.59
N	9	8	1	2		1

[1] ages in 1986 were estimated from northern pike aged in 1985 and size ranges.

Table 4. Length at age and weight at age of northern pike entered in the Belwood Lake Pike Derby, 1985 and 1987.

Age	II	III	IV	V	VI	VII
Mean Length (cm)	54.6	63.1	64.5	75.8	78.1	64.1
Length Range (cm)	47.5 - 61.3	50.0 - 70.9	47.0 - 77.0	63.0 - 86.6	63.0 - 95.0	64.1
Mean Weight (kg)	1.00	1.58	1.72	2.82	3.01	1.70
Weight Range (kg)	0.68 - 1.47	0.82 - 2.30	0.68 - 3.13	1.41 - 4.22	1.54 - 4.76	1.70
N	20	27	19	5	3	1

Appendix 1: Belwood Lake Northern Pike Stocking Records

Year	Number	Size	Source of Fish	Sources of Information
1970	100		Pinehurst Lake	Sandilands 1972, W. Yerex, pers. comm., 2011. Guelph Area Fish Stocking Database
1972	100		Grand River below Shand dam	Guelph Area Fish Stocking Database
1973	40		Pinehurst Lake and Shades Mills Reservoir	Kitchener-Waterloo Record
1973	~ 1,200	6" - 8"	Watt's Pond (Charlie Creek)	Al Sandilands pers. comm., 2011
1977			Grand River below Shand dam	Guelph Area Fish Stocking Database, April 13 - 14
1987	24		Conestogo River below Conestogo dam	
1989	5	up to 20"	Grand River below Shand dam	Guelph Area Fish Stocking Database
1994	212	18" average	Orangeville Reservoir	Belwood & District Lions Club
1995	111		Orangeville Reservoir	Belwood & District Lions Club

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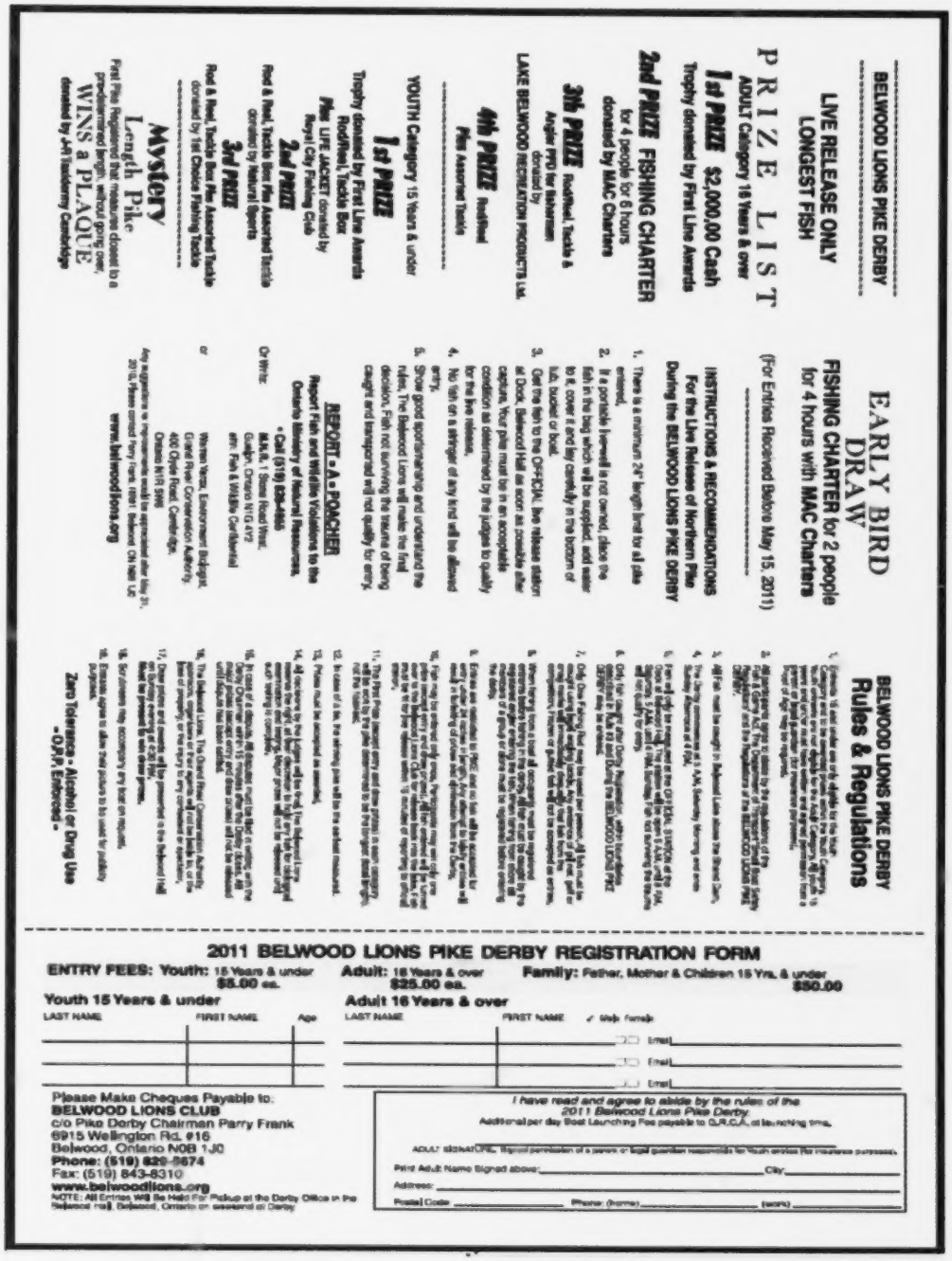
Appendix 2. Belwood Lions Pike Derby Rules and Regulations



BELWOOD LIONS PIKE DERBY

LIVE RELEASE ONLY
LONGEST FISH

PRIZE LIST

ADULT Category 16 Years & over

1st PRIZE $2,000.00 Cash
Trophy donated by First Line Awards

2nd PRIZE FISHING CHARTER
for 4 people for 6 hours
donated by MAC Charters

3th PRIZE Rod/Reel, Tackle &
Angler Pro Ice Skimmer
donated by
LAKE BELWOOD RECREATION PRODUCTS Ltd.

4th PRIZE Rod/Reel
Plus Assorted Tackle

YOUTH Category 15 Years & under

1st PRIZE
Trophy donated by First Line Awards
Rod/Reel, Tackle Box
Plus LIFE JACKET donated by
Royal City Fishing Club

2nd PRIZE
Rod & Reel, Tackle Box Plus Assorted Tackle
donated by Natural Sports

3rd PRIZE
Rod & Reel, Tackle Box Plus Assorted Tackle
donated by Tori Choice Fishing Tackle

Mystery
Length Pike
First Pike Registered that measures closest to a predetermined length, without going over,
WINS a PLAQUE
donated by JAI Taxidermy Cambridge

EARLY BIRD DRAW
FISHING CHARTER for 2 people
for 4 hours with MAC Charters
(For Entries Received Before May 15, 2011)

INSTRUCTIONS & RECOMMENDATIONS
For the Live Release of Northern Pike
During the BELWOOD LIONS PIKE DERBY

1. There is a minimum 24" length limit for all pike entered.
2. If a portable livewell is not owned, place the fish in the bag which will be supplied, add water to it, cover it and lay carefully in the bottom of M.A. bucket or boat.
3. Get the fish to the OFFICIAL live release station at Dock, Belwood Hall as soon as possible after capture. Your pike must be in an acceptable condition as determined by the judges to qualify for the live release.
4. No fish on a stringer of any kind will be allowed entry.
5. Show good sportsmanship and understand the rules. The Belwood Lions will make the final decision. Fish not surviving the trauma of being caught and transported will not qualify for entry.

REPORT • A • POACHER
Report Fish and Wildlife Violations to the
Ontario Ministry of Natural Resources.
• Call (519) 826-4955
M.N.R. 1 Stone Road West,
Guelph, Ontario N1G 4Y2
attn: Fish & Wildlife Coordinator
or
Warren Yerex, Environment Biologist,
Grand River Conservation Authority
400 Clyde Road, Cambridge,
Ontario N1R 5W6

Any suggestions or improvements would be appreciated after May 21, 2010. Please contact Perry Frank, Belwood ON N0B 1J0
www.belwoodlions.org

BELWOOD LIONS PIKE DERBY
Rules & Regulations

2011 BELWOOD LIONS PIKE DERBY REGISTRATION FORM

ENTRY FEES: Youth: 15 Years & under $5.00 ea. Adult: 16 Years & over $25.00 ea. Family: Father, Mother & Children 15 Yrs. & under $50.00

Youth 15 Years & under
LAST NAME FIRST NAME Age

Adult 16 Years & over
LAST NAME FIRST NAME ✓ Male Female

Please Make Cheques Payable to:
BELWOOD LIONS CLUB
c/o Pike Derby Chairman Perry Frank
6915 Wellington Rd. #16
Belwood, Ontario N0B 1J0
Phone: (519) 829-5674
Fax: (519) 843-5310
www.belwoodlions.org
NOTE: All Entries Will Be Held For Pickup at the Derby Office in the Belwood Hall, Belwood, Ontario on weekend of Derby

I have read and agree to abide by the rules of the 2011 Belwood Lions Pike Derby
Additional per day Boat Launching Fee payable to G.R.C.A. at launching area.

ADULT SIGNATURE

Print Adult Name Signed above: City

Address:

Postal Code Phone: (home) (work)

Appendix 3. Belwood Lions Pike Derby Creel Card

BELWOOD LAKE PIKE DERBY
DRAW PRIZE ENTRY

NAME _____

ADDRESS _____

CITY _____ POSTAL CODE _____ PHONE _____

How many hours did you spend fishing? Saturday _____ Sunday _____

How many Pike did you catch? Saturday _____ Sunday _____

How many Pike did you keep? Saturday _____ Sunday _____

What general area did you fish in? _____

What other species of fish did you catch? _____

What was the average size
in inches of pike released? Saturday _____ Sunday _____

How many days in a year do you fish on Belwood Lake? _____

What other local areas do you usually fish? _____

What species do you usually like to fish for? _____

Comments _____